

REMARKS

Claims 1, 3-7, 9-10, 12-16, and 35-40 are pending in the application. Those claims all stand rejected over the combination of references of McSparran et al. (U.S. Patent No. 4,658,334), Iwane (U.S. Patent No. 6,719,750), and Pressler et al. (U.S. Patent No. 5,550,713) under § 103. Specifically, the pending claims are rejected as being obvious over those references.

The claims have been further refined, including cancellation of various claims to specifically recite the unique combination of elements that make up the inventive power amplifier and provide the desired reduced manufacturing and production costs while increasing the overall performance and reliability of the amplifier by maintaining the desired isolation of the high power amplifier subcircuits and reducing the electromagnetic (EM) and/or radiofrequency (RF) interference and noise. Furthermore, the unique circuit board arrangement of the invention in its multiple layers provides a single and consistent ground reference for all of the signals in the power amplifier assembly thereby reducing the number of discrete wiring components and reducing undesired interference and noise.

The present invention accomplishes these desired goals through a combination of various elements, including of the arrangement of the components on the printed circuit board, including controlled impedance circuits, the use and placement of specific ground planes within the printed circuit board to complete the controlled impedance circuit and to provide a direct and rigorous to the chassis body ground, and the use of a plurality of integral walls for surrounding subcircuits for the purposes of isolation.

All of these elements work together to achieve the goals of the invention. They are not simply separate parts slapped together. That is, the present invention provides a unique combination of elements that are all specifically directed to a power amplifier, such as those utilized in cellular communications, which have high power gain circuits and other RF interference affected circuits. As such, the prior art, in order to teach a unique combination of components, must address such a function of the power amplifier and the desire to maintain the proper operation of the various sensitive components and simultaneously provide for a compact, reliable, and readily manufactured power amplifier. The current art cited by the Examiner does not do so.

The current references cited by the Examiner (even if there were proper motivation to somehow combine those references) do not teach the claimed invention because the combination does not teach all of the recited claims. Additionally, for those various references, there, in fact, is no teaching or motivation to a person of ordinary skill in the art for somehow combining the references. Rather, as the claims have been refined through prosecution to specifically define the invention and to define over the prior art, the Examiner has gotten further away from the purpose of the invention and has shopped around to other unrelated references to selectively pick different components without attention to the motivation that would actually drive a person of ordinary skill in the art to combine those references and any element or features of those inventions. The Applicant, therefore, respectfully asserts that there is no motivation to use a cell phone circuit board (Iwane) in a power amplifier of a base station and any combination of the cited references could only be done by improper hindsight.

Specifically, the present invention has been further amended to refine the invention. As such, independent claim 1 recites that the subcircuits include components mounted on the first signal distribution layer and controlled impedance circuits used for operation of such components. The second ground plane layer is recited as completing the controlled impedance circuits. Furthermore, claim 1 recites that the chassis body has a main surface, and that the substantially metallized fourth ground plane layer couples directly with the main surface to provide a ground reference to the circuit board. Still further, the second ground layer is recited as being directly coupled with the fourth ground layer for providing proper grounding and shielding of the subcircuits. Finally, claim 1 recites a plurality of walls that are integrally formed with the lid structure, and extending from the lid structure for surrounding the subcircuits to electronically isolate the subcircuits. As noted, the references, even when combined, would not even teach the power amplifier recited in claim 1, in addition to the fact that there is no motivation to make such a combination.

The Examiner relies upon McSparran et al. as the main reference to teach a chassis having a multiple layer circuit board. However, as the Examiner recognized, the McSparran et al. reference does not teach the unique layers recited in claim 1 including the second and fourth ground plane layers, with the fourth ground plane layer being substantially metallized. Recognizing this, the Examiner has turned to the Iwane reference for teaching multiple ground plane layers. In so doing, the Examiner has merely found two elements that are called ground layers within the same board. However, the Examiner ignores the purpose of the Iwane reference. The Iwane reference utilizes two ground

layers in order to maintain two different, and isolated, ground references. This is completely opposite the present invention, which desires a single ground reference for all signals in the power amplifier, as discussed on Page 4 of the present application. Referring to column 2 of the Iwane reference, the ground layers being taught are electrically insulated within the board. Therefore, the Iwane reference does not provide any teaching regarding the second ground layer being directly coupled with the fourth ground plane layer for providing proper grounding and shielding of the subcircuits.

Furthermore, the Iwane reference does not teach or suggest a chassis body having a main surface that is coupled directly with the substantially metallized fourth ground plane layer of the circuit board to provide a ground reference to the circuit board. In the present invention, utilizing high power gain subcircuits and other RF subcircuits, it is very important to maintain a stabilized ground reference with the chassis body. Again, the claims recite a chassis body having a main ground surface, a lid structure with a plurality of integral walls, and a multi-layer circuit board for providing controlled impedance circuits, which are completed by one ground plane layer (second layer), and then directly coupling a second ground plane layer (fourth layer) with the original ground plane layer. As such, the McSparran et al. reference, combined with the Iwane reference, would not teach the invention as presently recited in claim 1. Iwane does not teach that combination with or without McSparran et al. In fact, Iwane teaches away from the directly coupled ground layers and their orientations.

Furthermore, the McSparran et al. reference does not show any lid structure in the chassis body wherein a plurality of walls are integrally formed with the lid structure

and disposed for surrounding the subcircuits. The Pressler et al. reference does teach a chassis having integral walls therewith. However, Pressler et al. does not provide any teaching of the elements of claim 1 or the specific elements that are lacking in the McSparran et al. and Iwane combination.

Additionally, the Iwane reference is directed to an amplifier for a cellular telephone, that is, that would fit in a cellular telephone. Such a component is small and is utterly different in operation and result from the claimed power amplifier of the pending case that is utilized with base station equipment, and is utilized to amplify all outgoing or down linked signals associated with that base station. Iwane, therefore, is actually not relevant art.

The Examiner recognizes that the McSparran et al. reference does not teach any specific controlled impedance circuitry. Therefore, the McSparran et al. reference cannot provide a teaching of such circuitry to a person of ordinary skill in the art. However, the Examiner further argues, unsupported by any cited prior art or other reference, that it would simply be obvious that one of the single distribution layers would include circuitry that may be considered a controlled impedance circuit because gain amplifiers typically include controlled impedance circuits to function as feedback networks. There is absolutely no teaching in the references of record regarding such controlled impedance circuits as part of RF high power amplifiers. Even if there was, there is still no teaching or suggestion with respect to the unique combination of layers utilized in the circuit board recited in the power amplifier of claim 1, which incorporates controlled impedance circuits completed by a second ground plane layer and utilizing a fourth ground plane layer to

couple directly to a chassis body main surface, and then directly coupling the substantially metallized fourth ground plane layer with the second ground plane layer. The conclusory statement that utilizing the ground plane layer of the second layer to compete circuits is found in the art does not provide a *prima facie* case of obviousness for teaching the power amplifier recited in claim 1. Accordingly, claim 1 recites a unique combination of elements not taught or suggested by the currently cited references.

Claims 1 and 10 were further rejected under the combination of McSparran et al. and Iwane with an alternative argument that it would have been obvious to modify the circuit board of McSparran et al. to provide a second conductive layer between the first and third signal distribution layers and to provide a substantially metallized ground plane for providing an additional separate, and electrically isolated, ground plane layer for connection with the first and third signals layers to minimize interference. However, the present invention is not directed to providing a separate ground plane layer that would be electrically isolated from the first ground plane layer. Quite the opposite, rather, the elements recited as the second and fourth ground plane layers are directly coupled together, with the substantially metallized fourth ground plane layer being, in turn, directly coupled with the main grounding surface of the chassis body. Again, such a combination is not taught by the combination of McSparran et al. and Iwane.

The Examiner rejects additional claims 13-15 and 38 over a combination of McSparran et al. and Iwane, as further modified by Pressler et al. However, the Pressler et al. reference is included for reciting a coupling channel or pathway formed in the chassis body for connections between subcircuits. As such, Pressler et al. does not provide the

elements missing in the base references for somehow teaching the power amplifier recited in claim 1.

Accordingly, claim 1 is allowable over the cited art. Claims 3-7 and 12-16, which depend from claim 1 are allowable for those reasons stated above. Furthermore, those dependent claims recite unique combinations of elements that are not taught by the cited art.

The pending method claim 35 recites a method of isolating subcircuits of a power amplifier, and further recites the limitations similar to those in claim 1, discussed above. Specifically, the subcircuits include components mounted on the first signal distribution layer and controlled impedance circuits utilized for operation of such components. The second ground plane layer completes the controlled impedance circuits. A fourth ground plane layer is provided and is substantially metallized. It is coupled directly with the main surface of the chassis body. The second ground plane layer is directly coupled with the fourth ground plane layer to provide the desired grounding of the subcircuits. Therefore, for the reasons discussed above, claim 35 is also allowable over the cited art. Claims 36-40 depend from claim 35 and further recite unique combinations of method steps not cited by the pending art.

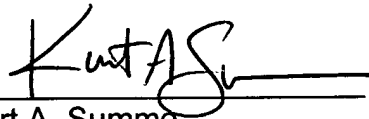
CONCLUSION

Applicant submits that the currently pending claims are in an allowable form and, therefore, requests a Notice of Allowability of the application at the Examiner's earliest convenience. If any issues remain in the case which might be handled in an expedited fashion, such as through a telephone call or an Examiner's Amendment, the Examiner is certainly encouraged to telephone the Applicant's representative or to issue an Examiner's Amendment.

Applicant knows of no fee due with this submission. However, if any fees or credits are deemed necessary herein, Applicant hereby authorizes them to be charged to Deposit Account 23-3000.

Respectfully submitted,

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